

# Recycling Site Visit Report

## State Sustainability Program

### December 2003



**Date of visit:** September 19, 2003  
**Location:** DPH Lab, Jamaica Plain  
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## I. Overview

This report is the result of a site visit at the DPH State Lab facility conducted by EOEa on September 19, 2003 to review solid waste practices and recommend strategies to increase recycling, decrease waste generation, and decrease solid waste handling costs. Recommendations are as specific as possible but are not meant to be comprehensive, and include issues and questions to be addressed by DPH facility managers, who have the best understanding of the opportunities at their facility. EOEa will schedule a follow-up meeting with facility staff upon receipt of this report to discuss options and possible strategies for implementation.

### Facility Operations

The DPH State Lab facility, which is operated by the University of Massachusetts Medical School, consists of three major buildings: the State Laboratory Building, the Biologics Lab, and the Stables (offices and administration for the Biologics Lab). The facility is occupied by approximately 700 staff who work for UMass Medical, DPH, and the Food and Drug Administration programs:

While a different Director runs each Department, UMass Medical Center or DPH staff handle certain operational practices for the entire facility, including:

EH&S: Managed by UMass Medical Center staff  
 Solid Waste: Managed by UMass Medical Center staff (some may be contracted out)  
 Stockroom: Managed by Paul Walsh, DPH

Building	Sq Feet	Size	# Staff	Overview
State Lab 305 South St	190,000	8 stories	500	Mainly a lab facility but also includes offices, a cafeteria (services contracted to Corporate Chef), a print shop, a stockroom, and animal care facilities
Biologics Lab 375 South St	30,000	2 stories		Mainly Pharmaceutical labs – manufacture vaccines
Stables 379 South St	25,000			Admin/Offices for Mass Biologics Lab (MBL)

### Summary of Recommendations:

1. Switch from white paper only to a **mixed paper and corrugated cardboard** recycling program
2. Increase paper collection frequency from every three weeks to every two weeks
3. Recycle wooden pallets (see price quotes in Appendix)
4. Investigate state contract pricing for recycling of fluorescent lamps, switch vendors if cheaper
5. Review DEP's Paper and Postage Reduction campaign, determine if is applicable to State Lab

### Summary of Potential Benefits:

1. Potential to prevent 50+ tons pf paper & cardboard and 11 tons of wood from pallets from disposal in land-fill or incineration
2. Potential cost-savings of \$1000 + per year by switching to a mixed paper and cardboard recycling

3. Potential to reduce costs per ton for disposal of pallets (need current cost for disposal of pallets to determine cost-savings potential –estimated savings of \$145 per year)

## **II. Baseline Solid Waste and Recycling Practices**

### **Current Solid Waste Contract:**

UMass currently contracts with BFI for the hauling and processing of solid waste, and the rental of a 30 yd compactor located at Loading Dock A, which is used for most of the every-day waste generated at the facility. BFI will also provide a 30 yd dumpster, when necessary, for the collection of bulky items such as old furniture, wooden pallets and other large items. This dumpster is usually located in a corner of the parking lot.

Under the current contract with BFI UMass pays a volume-based hauling fee of \$150 per haul for the 30 yd compactor located at the main loading dock and a landfill tipping fee of \$88 per ton. The facility also pays \$200 a month in rental fees for the 30-yard compactor. In FY02 the facility generated 236 tons of trash and paid \$32,240 (PLEASE NOTE: this total does not include fees for the disposal of bulky items in the 30 yd dumpster provided on an as-need basis by BFI).

### **Current Recycling Contracts:**

Paper UMass contracts with Jet-a-Way for the hauling and processing of white paper and the rental of totes for collecting and storing collected paper. The facility does not pay for the collection and recycling of white paper, and receives revenue from the material totaling approximately \$800 in fiscal year 2002 (approximately \$36 in revenue per ton).

Fluorescent lamps and electronics are recycled at the facility on an on-call basis through a contract with Onyx. Lamps are handled by the EH&S department.

Toner cartridges are recycled in some departments, but this is not a facility-wide practice.

Yard waste (leaves and grass clippings) are collected and managed on site without an additional costs to the facility, other than staff time.

Cans & bottles with \$.05 deposits are collected in bins in the cafeteria and redeemed by cafeteria staff. Non-deposit bottles are disposed of in the trash.

**Summary of Current Contracts:**

Material	Vendor	Equipment	Payment Structure	Cost/ Year	Tons / Year	Cost per ton
Trash	BFI	30 yd compactor	\$150 per pickup (on-call basis)	\$9000	236	\$136/ton
			\$88 per ton tipping fee	\$20,768		
			\$200 per month rental fee	\$2400		
White Paper	Jet-A-Way	Toters on each floor, material bagged and stored on loading dock	- Collected approx. every three weeks	+ \$800	22	+ \$36
Fl lamps	Onyx			N/A		
Electronics		On-call basis	Collections 2-3 x's per year	N/A		
Biomedical			N/A	N/A		
Cans/Bottles		Bins for in cafeteria	Janitorial/cafe staff collect redeemables in cafeteria	\$0		
Toner Cart.		Vary among dept		N/A		
Yard Waste		Facility staff & equipment	Collected & managed by facility staff	N/A		
Surplus Chemicals		EH& S staff	Staff tries to use chemicals, often has to dump or properly handle out-of-date material	N/A		

\*\*Please note – data on costs associated with toner cartridges, fl lamps, and electronics still needed. Information on contract renewal dates was not available at the time of this report

**Collection Procedure:**

Desk-side bins are placed in each office for trash and white paper recycling (blue), and are emptied by UMass janitorial staff. Trash is emptied on a regular basis (not sure exactly how often) and the recycling bins are emptied approximately every 3 weeks. Individual bins are emptied into 96 -gallon toters located on each floor for storing paper until pick-up by the vendor. Blue bins are also placed in copy rooms on each floor.

Most of the white paper is shredded, either by the custodial staff or by the staff on the floor, prior to placing in the recycling bin (this differs from floor to floor). Paper is bagged and stored on the loading dock until pick-up.

**III. General Recommendations****1. Familiarize facility staff on Massachusetts Waste Bans and materials that are currently banned from disposal in the state.**

- Visit the DEP website <http://www.mass.gov/dep/recycle/files/wstban01.doc>; for details on the following waste ban materials: recyclable paper, glass and metal containers, leaves and yard waste, certain batteries, white goods, tires, and cathode ray tubes

**2. Call vendors who specialize in recycling of particular materials for price quotes**

- Vendors who specialize in a certain commodity often have better pricing than an “all-in-one”, particularly for cardboard, paper, construction & demolition debris, etc.
- Use state-wide contract #ST1J391 for Solid Waste and Recycling Services which lists vendors by services they provide (visit <http://www.comm-pass.com> and search for “ST1J391”)

**3. Request regular reports from your solid waste and recycling vendors**

- Track monthly tonnages and costs using the spreadsheets provided with this report (or other tracking mechanisms).
  - o The State Sustainability Program Tracking and Reporting Form will be requesting this data from each major state facility in FY03

#### **4. Educate all staff on changes to recycling programs**

- Use signage available through the State Sustainability Program
  - o Visit: <http://www.mass.gov/envir/sustainable/resources> to view the “Mixed Paper”, “Bottles and Cans”, and General “Massachusetts Recycles” posters developed by EOEa. These posters are available for download, or contact the State Sustainability Program for printed copies.
- Request a list of what can and cannot be recycled from your recycling vendors, and post this list for all employees

#### **5. Identify opportunities for Waste Reduction at the facility (meaning using less of a material in the first place)**

- Research “Take-a-Pallet-Leave-a-Pallet” programs with vendors (see material specific recommendation # 2 for additional information)
- Determine if printers and copiers in the office areas of the facility have duplex capability, educate staff and set this as a default to reduce paper usage
- Post reports, memos, announcements online or through email as opposed to in print, when possible
- Review the DEP Paper and Postage Reduction program, determine if ideas may be applicable to the State Lab

## **IV. Material Specific Recommendations**

The following are recommendations identified by the State Sustainability Program that will most likely increase recycling rates and decrease solid waste disposal costs at the facility. It is our intention to discuss these recommendations with facility staff prior to their implementation, to ensure that assumptions made and cost and tonnage data used in estimates and models are correct and accurate.

EOEA has used a solid waste management model to breakout the current costs for solid waste and recycling, and to estimate cost-saving opportunities and potential changes to tonnage of material recycled or disposed of as trash, upon implementation of the recommendations. This spreadsheet will be referred to as the Solid Waste Management model or the “model” throughout this report, and has been provided with this report.

#### **1. Expand paper-recycling program to include mixed paper and corrugated cardboard**

The state lab facility currently recycles white paper only, but the facility generates other types of paper that could be recycled including newspapers, catalogues, colored paper (from the print shop), junk mail, flyers, yellow pads, etc. The Lab also generates a large amount of corrugated cardboard from deliveries, particularly to the stockroom and the print shop, which is currently disposed of as trash in the 30 yd compactor.

Recycling mixed office paper and cardboard is less expensive per ton (based on three price quotes in the Appendix) than disposing of paper as trash. While the facility will not generate revenues as with white paper (\$800 for 22 tons in FY02 = \$36 per ton), the cost-savings from reducing the number of trash pulls per year and the total tons of trash disposed will more than offset the loss of revenue. Cardboard in particular takes up significant volume in a dumpster, and the market for corrugated cardboard is currently quite strong, and is expected to remain so in the near future.

### **Potential cost-savings and increased recycling tonnage estimated using the model:**

In order to estimate the potential for increasing recycling at the State Lab facility we have used general waste characterization statistics from the EPA including the following:

- 30-40% of a typical medical/public administration facility is mixed paper (the lab's may be a bit less than this, since it is not a typical administration facility)
- Approximately 4-20% of a typical office's waste is recyclable corrugated cardboard (one vendor estimated cardboard may be up to 25% of a typical lab's waste stream)

We used this data to help identify potential tonnages the lab could realistically recycle which we can plug into the solid waste model to determine cost savings opportunities. We have presented three potential scenarios below, based on the waste characterization statistics discussed above:

Please note that the estimated cost-savings identified in each of the scenarios below assume that the lab continues to use an "on-call" basis for trash hauling, in which case cost-savings will be seen in two places:

1. Reducing tipping fees (the lab pays \$88 per ton disposal fee for trash)
2. Reducing hauling fees (the lab currently pays \$150 per haul, reducing total tonnage of trash disposed should reduce the overall # of hauls – assuming the on-call payment structure is still in place for trash pick-ups).

Note: In FY02 the state lab facility recycled 22 tons of white paper, which is approximately 9% (by weight) of their total waste stream.

**Case 1:** A conservative estimate to determine the "break even" point when switching from white paper to mixed paper and cardboard recycling would be cost-neutral for the facility (essentially when cost-savings would just offset revenue from white paper).

- switching to mixed paper recycling would increase paper collection from 22 tons to **26 tons** (from 9% to 10% of total waste stream)
- recycling corrugated cardboard would pull **10 tons** from the waste stream (4% of the total waste stream)

**Case 2:** A more realistic estimate based on waste characterization studies done by the DEP

- switching to mixed paper recycling would increase paper collection from 22 tons to **26 tons** ((9% to 10% of total waste stream))
- recycling corrugated cardboard would pull **25 tons** from the waste stream (10% of the total waste stream)

**Case 3:** Estimates the amount of paper and cardboard that would need to be generated and recycled to offset the costs of renting (or purchasing) a cardboard baler

- Assumes the facility has enough room for a small, mobile cardboard baler in the stockroom, on the loading dock, or in some other convenient location
  - Ver-tech baler model number M-42 cost: \$4200 or \$120/month (rent-to-own)
- Estimated savings would be \$454 for the first 3 years, \$1900 a year after baler is paid-off

General Assumptions:

- Assumes that the facility does NOT generate 10 full totes of mixed paper every two weeks, and has to pay \$3 rental fee per tote/per month and \$20 per pick-up hauling fee for cardboard and paper recycling

### Summary of model Cases

	Current Costs	Case 1	Case 2	Case 3
<b>TRASH</b>				
Tons of trash disposed	236	222	207	207
Cost per ton	\$88	\$88	\$88	\$88
Annual cost rental	\$2400	\$2400	\$2400	\$2400
Annual cost for hauling	\$9000	\$8542	\$7965	\$7965
Annual cost for disposal	\$20,768	\$19,545	\$18,225	\$18,225
Total annual cost	\$32,168	\$30,487	\$28,590	\$28,590
<b>RECYCLING</b>				
Material	White paper only	Mixed paper and OCC	Mixed paper and OCC	Mixed and OCC + baler
Total Tons recycled	22	36	51	51
Mixed Paper		26	26	26
Cardboard		10	25	25
Cost per ton	\$-36	\$24	\$17	\$45
Total annual cost	\$-796	\$880	\$880	\$2,320
Overall % Recycled	9%	14%	20%	20%
Tons of recycling + tons of trash	258	258	258	258
Annual cost of Recycling + Trash	\$31,372	\$31,367	\$29,470	\$30,913
<b>Annual potential cost savings</b>	-	\$5	\$1,902	\$454

The cost-savings and increased recycling tonnages modeled in the Cases above are based on relatively conservative estimates for recycling at the facility, resulting in recycling rates of between **14% and 20%**. We believe the lab has the potential to achieve a higher rate of recycling for cardboard and mixed paper at the facility, if a high staff participation rate can be achieved, which could result in significant savings of \$3000 to \$4000 per year.

It is recommended that facility staff track cardboard and paper generation (even if this is just through general observation) in order to identify more accurate estimates on tonnages that could be recycled, which can be plugged into the solid waste management model provided with this report.

#### Specific Recommended Actions:

1. Change your contract with Jet-a-way, or switch to another hauler, to allow mixed paper and corrugated cardboard to be picked up in the same haul.
  - a. EOEA received quotes from Save That Stuff and Office Paper Recovery Systems for mixed paper and corrugated cardboard – contacts and exact price quotes available in Appendix
2. We have identified 2 options for cardboard recycling:
  - a. Place a small cardboard baler in the stock room, or in some other convenient location, for baling corrugated cardboard
    - i. Ver-tech makes small, mobile cardboard balers that are ideal for facilities without extra space (this was a recommendation from Save That Stuff, who can provide additional information on the purchase, lease, and use of this equipment)
      1. <http://www.ver-tech.com/>

- ii. You may need to track cardboard collection for a week or a month prior to purchasing the baler, to ensure that enough cardboard is generated at the facility to off-set the upfront costs of renting the baler (See CASE 3 above for min. tonnages needed)
- b. Find room in the stock room to store several Gaylord boxes (large cardboard boxes) for collecting broken-down corrugated cardboard (See CASE 2 in the chart above)
  - i. Work with your hauler to determine if cardboard can be collected in gaylord boxes and how they can be purchased
- 3. Work with janitorial staff to:
  - a. Test frequencies for emptying desk-side bins, starting with twice per month
  - b. Identify the best way to store paper in totes (current practice of storing totes on each floor until pick-up day seems to be a good solution)
- 4. Educate employees on changes to the paper and cardboard recycling programs:
  - a. Educate staff in stockroom and loading dock area on new procedures for cardboard and ensure OCC is not continuing to be placed in the compactor
  - b. Post new signs – EOEA has “Mixed Paper Recycling” signs available on the State Sustainability website at [www.mass.gov/envir/sustainable](http://www.mass.gov/envir/sustainable) or contact [jaclyn.emig@state.ma.us](mailto:jaclyn.emig@state.ma.us) for more information.
  - c. Post signs with detailed information on exactly what types of paper can and cannot be recycled in the paper bins (this should be available from your hauler)
  - d. Send facility-wide email with a list of new materials that can be recycled and the reason for switching

## **2. Reuse (take-a-pallet-leave-a-pallet) or Recycle Wooden Pallets**

UMass staff indicated that wood pallets make up a significant portion of the State Lab waste stream, but we do not have a good understanding of how pallets are currently disposed or how much money is currently spent disposing of these pallets. This information will be necessary in order to accurately identify cost-savings opportunities from recycling pallets.

### Recommended Actions:

- 1. Assign one staff member to identify some basic information on the handling of pallets at the facility
  - a. How many are received by the facility each month and where are they from (are they mainly from one vendor, from many vendors?)
  - b. Who handles most of the pallets?
  - c. Where are they currently stored?
  - d. How are they disposed (most often)?
  - e. How much does this cost – if this data is available?
- 2. If possible, work with vendors to set up a “Take-a-pallet-leave-a-pallet” system
  - a. Works best if most of the pallets are from a few main vendors, and these vendors do not use a 3<sup>rd</sup> party trucking company
  - b. Program must be discussed with individual vendors
- 3. If “Take-a-pallet-leave-a-pallet” is not an option, contact Save That Stuff (or another vendor on state contract) for a site visit and to set up a contract for pallet recycling.
  - a. Price quote from Adam Mitchell at Save That Stuff – 1-617-241-9998 x2
  - b. \$1.50 per pallet, minimum of 20 pallets per pickup
  - c. Other price quotes for renting of dumpsters, etc. are available in the Appendix

4. Work with facility staff to identify where 20 pallets can be stacked at the facility in preparation for pick-up by Save That Stuff
  - a. Pallets can be stacked outdoors and can get wet

**Potential cost-savings estimated using the model:**

In order to give a general idea on the costs associated with recycling pallets we requested price quotes from several vendors and used some general assumptions and estimates, identified below.

Please note that these numbers are based on the DPH lab staff estimates:

- Approximately 10 pallets are left at the facility per week
- The cost of disposing of hauling and disposing a dumpster of pallets (holding approximately 90 pallets) was \$525.00 per pull.

The cost saving calculations below are based on a prices quote from a vendor on the state contract who charges \$15.0 per pallet, with a minimum of 20 pallets per pick-up (see Appendix 1 for specific price quotes).

Assumptions and calculations:

- Calculations are based on a price quote of \$1.50 per pallet, minimum of 20 pallets per pick-up
- Assumes each pallet weights .02 tons (from EPA WasteWise conversion factors)
- Assumes that 20 pallets can be stacked and stored at the facility prior to calling for pick-up (price quote is based on a pick-up of at least 20 pallets at a time)
- Assumes that the DPH facility generates approximately 10 pallets per week

**Cost estimates for recycling wood pallets (price quote from Save That Stuff)**

	<b>Base Case – 20 yd dumpster disposed as trash*</b>	<b>Recycling Pallets (Save That Stuff)</b>
<b>Pallets</b>		
# pallets per year	520	520
Cost per pallet	\$5.80	\$1.50
Annual cost hauling	\$3,016.00	\$780.00
Annual cost disposal	\$0?	\$0
Total cost	\$3,016.00	\$780
<b>Annual potential cost savings if recycle pallets</b>	<b>--</b>	<b>\$2,236</b>

\* Pricing based on staff estimate of \$525.00 for a pull of approximately 90 pallets

**3. Recycle Toner cartridges and purchase remanufactured toner cartridges**

Recycling and purchasing remanufactured toner cartridges offer significant cost-savings opportunities of 30-60% for state agencies. In fiscal year 2002 users of the statewide contract for toner cartridges saved over \$400,000 by purchasing remanufactured toner cartridges.

Some departments at the State Lab recycle toner cartridges and purchase remanufactured cartridges, but the practice varies by department.

Recommended Actions:

1. Promote the recycling and purchase of remanufactured toner cartridges in all departments
  - Review the statewide contract for Office Supplies #OFF06 for information on recycling and purchasing remanufactured cartridges



- Use the fact sheet on remanufactured toner cartridges, available on the EPP website at <http://www.state.ma.us/osd/enviro/info/factsheets3/Toner.pdf> and included with this report, to educate purchasing staff on the products
- Utilize the “Cost Comparison” chart to determine potential cost-saving opportunities for the entire facility

#### 4. Waste Prevention Programs

Waste Prevention, the practice of reducing the amount of material used in the first place, before it becomes a waste, is an important part of any Waste Reduction Program, and can often reduce costs through purchasing less as well as reducing disposal costs.

For example, in 2002 The Massachusetts Department of Environmental Protection (DEP) initiated a “Paper and Postage Reduction at their own facility in Boston to demonstrate the potential environmental and economic benefits of reducing paper usage. The campaign involved several projects including:

- Emailing news clips instead of printing them out once a week to give to staff, saving approximately \$8700 in materials costs alone
- Making applications and forms available online for the TURA, reducing the need to send out “packets” to each participating company, saving 8700 and eliminating the need to use 910 pieces of paper
- BWP-Business Compliance Division redesigned its 1,400 hazardous waste recycler mailings to replace standard letter size paper with postcards, saving \$231

It appeared as though the state lab does a fair amount of printing and mailing, and it may be useful to review printing and mailing practices for cost-saving and paper-reducing opportunities.

For more information on the Paper and Postage Reduction Program at DEP, or if you have other questions relating to Waste Prevention practices, contact:

**John Crisley at DEP, [john.crisley@state.ma.us](mailto:john.crisley@state.ma.us) or 617.556.1021.**

#### 5. Universal Waste - Mercury Fluorescent lamps

Current pricing for certain items on the statewide contract for collection and recycling of fluorescent lamps FAC26 is include below:

	<b>AERC</b>	<b>Northeast</b>	<b>ONYX</b>
<b>Fluorescent lamps (per foot)</b>			
Collected Price	Less than 5000 feet: .065 5000-10,000 feet: .0625 over 10,000 feet: .06	Less than 5000 feet: .0675 5000-10,000 feet: .065 over 10,000 feet: .0625	Less than 5000 feet: .075 5000-10,000 feet: .075 over 10,000 feet: .065
Delivered Price	.05	.0675	.05
<b>Compact Fluorescent (each)</b>			
Collected Price	.4	.36	.42
Delivered Price	.35	Same	.39
<b>HID and other lamps (each)</b>			
Collected Price	.85	.85	1.25
Delivered Price	.8	Same	1.00
<b>Mercury containing Devices (per lb)</b>			
Collected Price	2.00	5.95	2.75
Delivered Price	1.75	Same	2.25
<b>Mercury contaminated debris (per pail)</b>			
Collected Price	1.25 per 1 gallon pail 3.25 per 5 gallon pail	1.50 per 1 gallon pail 2.00 for 5 gallon pail	1.75
Delivered Price	same		same

### Other Mercury-containing items

Included below is a list of alternative options for common mercury-containing articles found in labs and medical facilities for which non-mercury alternatives exist.

## Commonly Found Mercury-Added Products

Product	Found Here	Substitute or Proper Handling
Thermometers	Hospitals, laboratories, fever, candy, deep fry, oven, indoor and outdoor thermometers with a silvery temperature indicator	Electronic, alcohol, or other types of non-mercury liquid thermometers
Thermostats	Office buildings, homes	Electronic models
Fluorescent Lamps	Indoor office lighting, backlit LCD displays	Recycle all mercury-added fluorescent lamps. LED (light-emitting diode) systems can replace backlit LCD displays
Switches	Found in electrical equipment, boilers, HVAC systems, utility rooms, etc.	Replace with mercury-free switches & relays, & gas equipment with electronic ignitions
Batteries	Button batteries from cell phones, older hearing aids, watches, calculators, pagers	Recycle all mercury-added batteries
Vehicles	Switches in trunk & hood-lights, and some 4-wheel drive anti-lock breaking systems (ABS)	
Gas-fired Appliances, Boilers & Heating Equipment	Gas-fired appliances that have pilot lights, including ranges, ovens, clothes dryers, water heaters, furnaces and space heaters	Purchase gas appliances with electronic ignitions
Sphygmomanometers (blood pressure equipment)	Hospitals, medical facilities	Aneroid & electronic devices are available
Barometers	Schools, doctor's offices, weather stations	Digital & other mercury-free barometers are available

Source: INFORM "Mercury-Containing Devices and Products"

### Mass Statewide Contracts Offering Mercury-Free Product Alternatives

1. HSP16: [Medical and Surgical Supplies](#)
2. FAC28: [Industrial/Commercial Supplies](#)

### Mass Statewide Contract Offering Mercury Collection & Handling

1. FAC26: [Fluorescent Lamp, Ballast and Computer Recycling](#)

### 6. Rechargeable batteries (if this is generated at the facility)

The Rechargeable Battery Recycling Corp. (RBRC) offers free recycling for rechargeable batteries to public agencies—website includes educational materials and information on how to sign up, <http://www.rbrc.org/>.

## 7. Surplus Chemical Management

UMass Amherst has a Chemical Reuse and Exchange Program (REX), which may be a useful model for managing surplus chemicals at the Lab. The website <http://www.ehs.umass.edu/rex.html> contains a list of currently available chemicals and contacts at the University.

In addition, DEP has been working with a consultant to review chemical purchasing practices at schools in Massachusetts (mostly high schools) and has developed a manual for school purchasing and chemical management staff. Lori Segal at DEP worked on this project, and can provide you with a copy of the manual and some general assistance in reviewing chemical purchasing and disposal practices.

Lori Segal can be reached at [lori.segall@state.ma.us](mailto:lori.segall@state.ma.us) or 617-292-5704.

## IV. Tracking and Monitoring

Monitoring costs and tonnages for solid waste disposal and recycling is important for all facilities, in order to fully understand the solid waste operations and to make adjustments in contracts and pick-up procedures that can save money and increase tonnages of material recycled, as opposed to disposed in landfills or incinerators.

The Solid Waste Management tool used to estimate cost-savings and tonnages in this report is a useful method of tracking solid waste at the facility, in conjunction with regular data collection from vendors in a simple spreadsheet. Please contact State Sustainability staff for assistance with using this tool.

### State Sustainability Tracking and Reporting Form

The State Sustainability Program is responsible for producing an Annual State Sustainability Report each year, starting in 2004. The Program has developed and distributed a Tracking and Reporting Form to collect qualitative environmental and operational data from each state agency in order to determine the total environmental impacts of agency operations, as well as program and projects aimed at reducing these impacts. Questions on Recycling and Waste Reduction data are included on this form, including questions on current recycling and trash disposal practices, costs, tonnages, etc. at each major facility operated by an agency. It is recommended that you review the section of this form on "Solid Waste and Recycling" and use this as a guideline for developing an internal tracking process.

The form is available on the **State Sustainability website** at <http://www.mass.gov/envir/sustainable> or on the internal Tracking website (which also posts any data collected centrally by the State Sustainability Program) at <http://www.ss.env.state.ma.us/> or contact [jaclyn.emig@state.ma.us](mailto:jaclyn.emig@state.ma.us) for more information.

## V. Questions to be addressed

The following are questions or concerns that UMass facilities staff should address prior to implementing the recommendations in this report.

### Space and Staff Time

1. Where is space the tightest, and can things be adjusted in the basement, near the loading dock, or at one of the other loading docks?
2. What are the time constraints on janitorial staff?
3. Can emptying of small blue bins be increased to twice a month? Or more frequently, depending on the amount of mixed paper generated as opposed to white paper generated?

### Paper and cardboard collection

1. Can janitorial staff fit more frequent blue bin emptying into their schedule and adjust as needed?
2. What percent of total solid waste generation do you estimate mixed paper and cardboard to be? Enough that a small baler would be a cost-effective solution?
3. Can paper be picked up more often than every 3 weeks? Will this be a logistical problem?
4. Are there other areas, besides the stockroom, where OCC may be generated?

## Appendix I: Recycling Price Quotes

Compiled from state contract #ST1J391 by the Executive Office of Environmental Affairs, October 2003

### Mixed Paper/ Cardboard:

Vendor & Contact	Tote rental	Pickup fee	Pickup details	Annual cost	Comments
<b>Save that Stuff</b> Adam Mitchell 1-617-241-9998 x2	\$3/ month	\$20/ pickup	Tuesdays only	\$516 with pickup every 2 weeks, \$996 every week	-Would pick up cardboard at the same time - Pickup and rental of totes is free if <b>10 or more totes of mixed paper</b> are generated every two weeks
					Cardboard Baler – can be rented from Save That Stuff for \$120/ month or purchased for \$4200
<b>Capital Paper</b>	No fee	\$75/ pickup	Would pick up each week	\$3,900	-Cardboard mixed with paper - <i>Other option:</i> they will shred everything and charge 15cents/lb., no transportation cost
<b>Office Paper Recovery Systems</b> Mark Cohen 978-694-1450	\$5/ month	\$50/pickup		\$1260 with pickup every 2 weeks, \$2,460 every week	-Cardboard would be broken down and stacked
<b>Jet-A-Way</b>					-No cost estimate, want to do site visit

### Wooden Pallets:

Company	Cost	Size/ # of pallets	Comments
<b>New England Recycling</b> Norman Crowley 508-822-4345	\$400/ pickup Dumpster rental- free for 1 <sup>st</sup> 3 weeks then \$25/week	30 yard dumpster (22'x 5.5'x 7.5')	Not sure how many pallets dumpster holds
<b>Conigliaro Industries</b> Greg Conigliaro 508-872-9668	\$ 45 /stack	Stack = 17 pallets	\$160 min for pickup
<b>BP Trucking</b> Gary DePaolo 800-255-5566	\$595 plus \$10/week for container	Open-top container, holds about 150 pallets	
<b>Save that Stuff</b> Adam Mitchell 617-241-9998 x 2	\$1.50/pallet	Minimum 20 pallets	

## Appendix II: Links to Pollution Prevention Programs for Labs and Hospitals

Listed below are a series of links I found posted on a listserv relating to green purchasing, solid waste, hazardous chemical management, and other pollution prevention techniques targeted towards laboratories and hospitals. These links are not in any way associated with the Executive Office of Environmental Affairs, or the State Sustainability Program, and have been included with this report to point you towards additional information, if desired.

These links were posted on the EPPnet listserv by Lara Sutherland of INFORM, Inc.

\* The EPA has a program called Labs21 "dedicated to improving the environmental performance of U.S. laboratories." See <http://www.epa.gov/labs21century/>.

\* The Sustainable Hospitals Project lists vendors for health care products free of mercury, PVC, and latex. Many of these (such as thermometers) are used in research laboratories. See <http://www.sustainablehospitals.org> . They also have a case study on replacing xylene in an histology laboratory at <http://www.sustainablehospitals.org/PDF/XyleneAlternativesCS.pdf> . In addition, contacting them directly may result in more information: shp@uml.edu.

\* Hospitals for a Healthy Environment (a joint project between EPA, American Hospital Association, and Health Care Without Harm) may have some information related to laboratories on their website at <http://www.h2e-online.org/> . You should also have some luck posting your question on their listserv. Listserv information is at <http://www.h2e-online.org/programs/list.htm> .

\* If you are doing tissue fixing and staining, there are mercury-free substitutes for almost all mercury uses, and also less-toxic fixatives. Published papers on xylene substitutes can be found by searching PubMed at <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi> for "xylene substitutes." Email me OFF-LINE at sutherland@informinc.org for a fact sheet we developed with California DTSC on mercury-free histology examples.

\* Many laboratory reagents and products contain a mercury preservative, usually called Thimerosal. In some cases, it is possible to find reagents without mercury preservative. Dana Farber Cancer Center has compiled a list of companies that sell HRP antibodies without mercury preservatives at [http://research.dfci.harvard.edu/ehs/think\\_before\\_using\\_the\\_sink.htm](http://research.dfci.harvard.edu/ehs/think_before_using_the_sink.htm) . Minnesota has developed a list of laboratory reagents that contain mercury, for which alternatives may or may not be available: <http://mntap.umn.edu/health/92-Mercury.htm> .

\* The Canadian environmental labeling program Environmental Choice has certified petri plates that are "manufactured using material that offers a source reduction of at least 20% when measured using a weight to volume ratio." See <http://www.environmentalchoice.com/Company.cfm?group=97&cat=36> .

\* Although this resource is getting a little old at this point, Massachusetts published proceedings in 1998 from their pollution prevention for health care conference. Volume III is all about laboratories (mostly clinical) and includes information on fixatives. See <http://www.state.ma.us/ota/pubs/medp2wrkshp.htm#Proceedings>

\* Massachusetts also used to publish the Health Care EPP Newsletter, which covered some topics relevant to laboratories. See <http://www.state.ma.us/ota/otapubs.htm#eppnet> for newsletter archives. Useful articles include those covering remanufactured equipment (<http://www.state.ma.us/ota/pubs/eppdec00.htm#remanufactured> ), mercury in gauges and switches (<http://www.state.ma.us/ota/pubs/eppdec00.htm#mercury> ), New England Medical Center's microchemistry unit for slide analysis (<http://www.state.ma.us/ota/pubs/eppmay00.htm#Network> ), EPP in the clinical laboratory, the example of Albuquerque VA histology lab, and laboratory pollution prevention resources (<http://www.state.ma.us/ota/pubs/eppmarch00.htm> )

\* At this point, there is rarely a reason to use radioactivity for labeling in laboratory experiments. If you are using radioactivity, consult your vendors for chemiluminescent and other alternatives. A number of papers have been published evaluating non-radioactive clinical and research laboratory techniques. Search PubMed at <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi> for "non-radioactive" and several pop up.

\* If for some reason you are using large amounts of radioactivity that require lead apron shielding for personnel, lead-free aprons are now available:

- Bar-ray Lead-Free "EarthSafe" X-Ray Protective Aprons <http://www.bar-ray.com/ppfg.html>
- MarShield Offers Non-Lead Radiation Protection <http://www.marshield.com/lead-vinyl.htm>
- NL-Ply Non-Lead Radiation Protection Aprons from ProTechEyeWear  
<http://www.protecheyewear.com/protecheyewear/aprons.html>
- NL-Ply Non-Lead Radiation Protection Aprons from Shielding International  
<http://www.shieldingintl.com/services/protectionchoices.htm>
- Non-lead aprons <http://www.rci-pulsemed.com/lead.html>
- Non-Lead Radiation Protection Suits <http://www.saferamerica.com/saProducts.asp?categoryID=14>